

Stickney Postfire Regeneration Strategy

FEIS Workshop, IFSL

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SERAL ORIGIN of Species Comprising Secondary Plant Succession in Northern Rocky Mountain Forests

Seral origin, as defined by location relative to disturbance and time of establishment, describes the source of postdisturbance plant species constituting the vegetation of secondary plant succession (= forest succession). It provides a basis for categorizing postfire development modes.

SURVIVOR - - - - -	Extant predisturbance (prefire) plants capable of regrowth after burning. (Susceptibility to fire relates to growing-point location relative to fuel bed/mass.)
Perennial aerial stem Suprasurface stem	Phanerophytic, without adventitious buds. Chamaephytic, prostrate, mat-forming or stoloniferous stems growing <u>on</u> the organic mantle.
Surface rhizome	Hemicryptophytic, stout horizontal stem rooted on or embedded in the mineral ground surface.
Rootcrown Caudex Rhizome Geophyte	Phanerophytic, adventitious buds. Subsurface to near-ground surface stems. Underground stems. Deeper seated regenerative plant parts (usually stems: bulb, corm, etc. or root with adventitious buds).
Colonizer - - - - -	New plants established from post-disturbance (postfire) germinated seed.
Initial Colonizer	A seedling establishing in the initial community.
RESIDUAL COLONIZER:	Derived from seed on site at the time of disturbance. (= Initial <u>Onsite Colonizer</u>) Seed site in the ground. Seed site in tree crown.
Ground-stored Crown-stored	
INITIAL OFFSITE COLONIZER:	Derived from interaction of seed dispersal and germination substrate of the initial post-disturbance (postfire) community.
Secondary Colonizer	A seedling establishing in the post-initial community.
SECONDARY OFFSITE COLONIZER:	Derived from interaction of seed dispersal and germination substrate <u>and</u> established plants of the post-initial community.
Secondary onsite colonizer	Derived from seed of survivor or onsite colonizer.

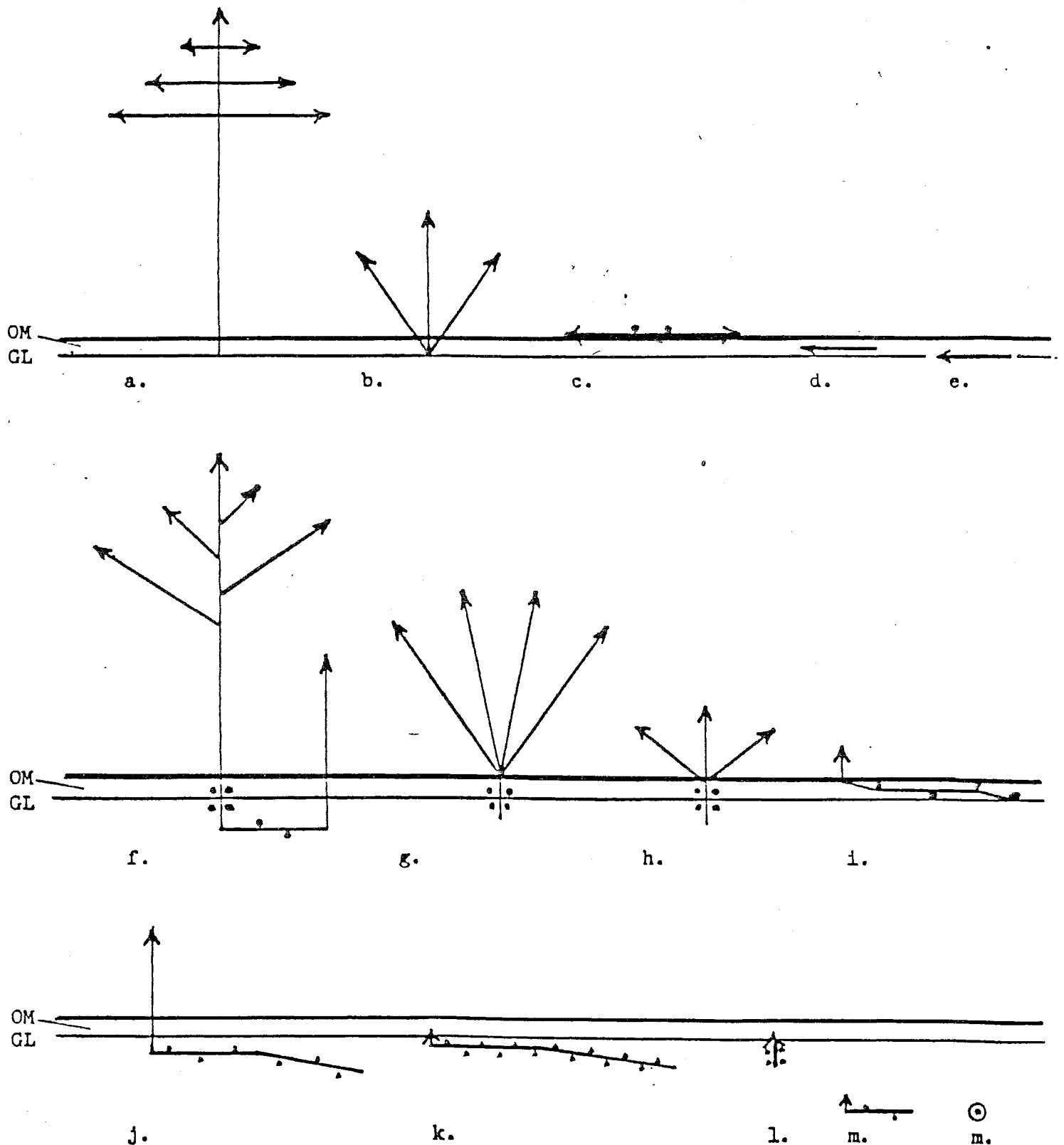


Figure 1. Seral origins for the survivor component of the initial community of forest succession in the Northern Rocky Mountains. Stylized life forms portray the perennial stem system and position of the active (arrowhead) and dormant (dots) growing points relative to the fuel bed of the forest floor (OM) and the mineral ground - organic mantle interface (GL). Life forms: a & b. perennial aerial stem without adventitious buds; c. suprasurface stem; d & e. surface rhizomes; f, g, & h. rootcrowns; i, j, & k. rhizomes; l. caudex; and m & n.

APPENDIX: SERAL CHARACTERISTICS OF THE FLORISTIC COMPOSITION OF THE FIRST DECADE'S SECONDARY SUCCESSION ON SUNDANCE BURN STUDY AREAS.

Species	Physiognomic life form	Seral origin	Fire survival adaptation	First/last S.Y. record	Occurrence		
					Pres	Freq	Cover
<i>Abies grandis</i>	Tree	Introduced		2	6	4	3
<i>Acer glabrum</i>	T-Shrub	Survivor	Root crown	1	12	2	4
<i>Achillea millefolium</i>	Herb	Survivor	Rhizome	1	11	2	1
<i>Adenocaulon bicolor</i>	Herb	Survivor	Caudex	1	3	1	
<i>Agoseris grandiflora</i> ^d	Herb	2d O-S colonizer		9	4	1	
<i>Agrostis alba</i> ^b	Herb	Introduced		1	12	7	3
<i>Agrostis exarata</i>	Herb	2d O-S colonizer		5	2	1	
<i>Agrostis scabra</i>	Herb	1 O-S colonizer(?)		1	9	1	
<i>ALNUS SINUATA</i>	T-Shrub	Survivor	Root crown	1	10	8	6
<i>Alpecurus pratensis</i> ^b	Herb	2d O-S colonizer		9	1		
<i>AMELANCHIER ALNIFOLIA</i> ^c	T-Shrub	Survivor	Root crown	1	14	12	4
<i>ANAPHALIS MARGARITACEA</i>	Herb	1 O-S colonizer		1	18	17	13
<i>Antennaria microphylla</i>	Herb	2d O-S colonizer		3	3		
<i>Antennaria neglecta</i>	Herb	2d O-S colonizer		9	1	1	
<i>Apocynum androsaemifolium</i> ^d	Herb	Survivor	Rhizome	1	12	9	4
<i>Arabis holboellii</i>	B-Herb	R-colonizer	GSS-1	1	3	1	
<i>Aralia nudicaulis</i> ^c	Herb	Survivor	Rhizome	1	2	2	2
<i>Arnica cordifolia</i>	Herb	Survivor	Rhizome	1	2	1	
<i>Arnica latifolia</i>	Herb	Survivor	Rhizome	1	2	2	1
<i>Asarum caudatum</i>	Herb	R-colonizer	GSS-1	1	2	1	
<i>Aster conspicuus</i>	Herb	Survivor	Rhizome	1	6		
<i>Aster engelmannii</i>	Herb	Survivor	Caudex	1	4	1	
<i>Aster laevis</i>	Herb	2d O-S colonizer		3/4	1		
<i>Athyrium filix-femina</i>	Herb	Survivor(A)		2	2		
<i>Berberis repens</i> ^c	LWP	Survivor	Rhizome	1	6	3	1
<i>BETULA PAPYRIFERA</i>	Tree	Survivor	Root crown	1			
		R-colonizer	GSS-1	1	8	5	2
<i>Bromus inermis</i> ^b	Herb	2d O-S colonizer		10	1		
<i>CALAMAGROSTIS RUBESCENS</i>	Herb	Survivor	Rhizome	1	10	7	4
<i>Calochortus apiculatus</i>	Herb	Survivor	Bulb	1	1	1	
<i>Campanula rotundifolia</i>	Herb	2d O-S colonizer		7	1		
<i>Carex deweyana</i>	Herb	R-colonizer	GSS(?)	1	1		
<i>Carex geyeri</i>	Herb	Survivor	Rhizome	1	2	2	1
<i>Carex pachystachya</i>	Herb	R-colonizer	GSS(?)	1	1	1	
<i>Carex rossii</i>	Herb	R-colonizer	GSS-2	1	17	12	10
<i>Castilleja miniata</i>	Herb	2d O-S colonizer		3	12	5	1
<i>CEANOTHUS SANGUINEUS</i>	T-Shrub	Survivor	Root crown	1			
		R-colonizer	GSS-2	1	14	12	10
<i>Ceanothus velutinus</i>	Shrub	Survivor	Root crown	1			
		R-colonizer	GSS-2	1	6	3	4
<i>Chenopodium album</i> ^b	A-Herb	Introduced(A)		1/1	1		
<i>Chimaphila umbellata</i>	Herb	Survivor(A)		3	2		
<i>Cirsium arvense</i> ^{b, d}	Herb	Survivor	Rhizome	1	4	1	1
<i>Cirsium vulgare</i> ^{b, d}	B-Herb	1 O-S colonizer		1	12	7	
<i>Clintonia uniflora</i> ^c	Herb	Survivor	Rhizome	1	17	8	3
<i>Collinsia parviflora</i>	A-Herb	R-colonizer	GSS-1	1	3	3	
<i>Conyza canadensis</i>	A-Herb	1 O-S colonizer		1	17	10	
<i>Cryptantha affinis</i>	A-Herb	R-colonizer	GSS-1	1	2	2	1
<i>Dactylis glomerata</i> ^b	Herb	Introduced		1	9	4	3
<i>Deschampsia elongata</i>	Herb	2d O-S colonizer		6	3		
<i>Disporum hookeri</i> ^c	Herb	Survivor	Rhizome	1	17	12	3
<i>Dracocephalum parviflorum</i>	B-Herb	R-colonizer	GSS-2	1/1	2		
<i>EPILOBIUM ANGUSTIFOLIUM</i> ^d	Herb	1 O-S colonizer		1	18	18	18
		Survivor	Rhizomatelike root	1			
<i>Epilobium paniculatum</i> ^d	A-Herb	1 O-S colonizer		1	13	8	
<i>Epilobium watsonii</i> ^d	Herb	1 O-S colonizer		1/6	16	9	
<i>Equisetum arvense</i>	Herb	Survivor	Rhizome	1	1		
<i>Erigeron acris</i>	B-Herb	2d O-S colonizer		8	8	4	
<i>Erucastrum gallicum</i> ^b	A-Herb	Introduced(A)		1/1	1		

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APPENDIX. (Con.)

Species	Physiognomic life form	Seral origin	Fire survival adaptation	First/last S.Y. record	Occurrence		
					Pres	Freq	Cover
<i>Secale cereale</i> ^b	A-Herb	Introduced		1/4	10	7	
<i>Senecio vulgaris</i> ^b	A-Herb	Introduced(A)		1/5	9	2	
<i>Silene noctiflora</i> ^b	A-Herb	Introduced(A)		1/3	2		
<i>Smilacina racemosa</i> ^c	Herb	Survivor	Rhizome	1	4	2	
<i>Smilacina stellata</i> ^c	Herb	Survivor	Rhizome	1	8	4	2
<i>Solidago canadensis</i>	Herb	Survivor	Rhizome	1	18	11	
<i>Sorbus scopulina</i> ^c	T-Shrub	Survivor	Root crown	1	4		
<i>Spergularia rubra</i> ^b	A-Herb	1 O-S colonizer		1/2	6	1	
<i>Spiraea betulifolia</i>	Shrub	Survivor	Rhizome	1	8	7	5
<i>Spiranthes romanzoffiana</i>	Herb	2d O-S colonizer		3	1		
<i>Stellaria media</i> ^b	A-Herb	Introduced(A)		1/5	3	1	
<i>Stellaria obtusa</i>	Herb	R-/I O-S colonizer(?)		1/1	1		
<i>Symphoricarpos albus</i> ^c	Shrub	Survivor	Rhizome	1	4	3	4
<i>Taraxacum laevigatum</i> ^{b,d}	Herb	2d O-S colonizer		5/6	2		
<i>Taraxacum officinale</i> ^{b,d}	Herb	1 O-S colonizer		1	13	9	
<i>Thalictrum occidentale</i>	Herb	Survivor	Rhizome	1	7	2	2
<i>Thuja plicata</i>	Tree	2d O-S colonizer		6	2		
<i>Tiarella trifoliata</i>	Herb	Survivor	Caudex	1	2	2	
<i>Tragopogon dubius</i> ^{b,a}	B-Herb	2d O-S colonizer		8	1		
<i>Trautvetteria carolinensis</i>	Herb	Survivor	Rhizome	1	4	1	
<i>Trifolium agrarium</i> ^b	A-Herb	2d O-S colonizer(?)		2/6?	1		
<i>Trifolium hybridum</i> ^b	Herb	Introduced		1	10	4	2
<i>Trifolium repens</i> ^b	Herb	Introduced		1	12	7	2
<i>Trillium ovatum</i>	Herb	Survivor	Corm	1	2		
<i>Trisetum cernuum</i>	Herb	2d O-S colonizer		10	2		
<i>Tsuga heterophylla</i>	Tree	2d O-S colonizer		6	4		
<i>Vaccinium membranaceum</i> ^c	Shrub	Survivor	Rhizome	1	17	9	6
<i>Viola glabella</i>	Herb	Survivor	Rhiz/Caud	1	6	3	
		R-colonizer	GSS-1	1			
<i>Viola orbiculata</i>	Herb	Survivor	Rhizome	1	16	16	
		R-colonizer	GSS-1	1			
<i>Xerophyllum tenax</i>	Herb	Survivor	Rhizome	1	8	3	3

(TOTAL: 139 species)

LEGEND:

Species:

Names in capital letters denote principal cover species; (15 + percent cover)

^aseed or fruit capable of long-range wind dispersal

^bexotic species

^cberry or berrylike fruit, bird and/or animal dispersed

^darmed fruit, animal dispersed

Physiognomic life form:

T-Shrub = tall shrub (maximum height > 2 m)

LWP = low woody plant (maximum height < 0.5 m)

A-Herb = annual herb

B-Herb = biennial or short-lived perennial herb

Seral origin:

Introduced denotes planted or seeded by man

R-colonizer denotes residual colonizer (onsite source)

1 O-S colonizer denotes initial offsite colonizer (immigration in succession year 1)

2d O-S colonizer denotes secondary offsite colonizer (immigration after succession year 1)

Double entry in the species listing indicates those 14 species that exhibited more than one seral origin

(A) = accidental; denotes very infrequently surviving species or introduced as a "weed" seed in seeding mixture

Fire survival adaptation:

CSS = Tree crown source seed (onsite); 1 short-term viability, 2 long-term viability

GSS = Ground source seed (onsite); 1 short-term viability, 2 long-term viability

First/last succession year (S.Y.) record: First and last year of recorded occurrence

Occurrence: Numerals denote the number of study areas on which the species occurred as presence, frequency, and cover, respectively

**APPENDIX: VEGETATION INITIATING SECONDARY FOREST SUCCESSION ON SUNDANCE BURN STUDY AREAS—
FLORISTIC COMPOSITION OF THE FIRST POSTFIRE YEAR AND SPECIES RESPONSE TO THE FIRE**

Species	Abbreviation	Sundance Burn study area																		
		01	02	03	04	05	06	07	08	09	10	14	15	16	17	18	19	20	21	
TREES																				
<i>Abies grandis</i> ¹	ABGR																			
<i>Betula papyrifera</i>	BEPA	RS ²	RS			S				S						RS		S		
<i>Larix occidentalis</i> ¹	LAOC																			
<i>Picea engelmannii</i> ¹	PIEN																			
<i>Pinus contorta</i>	PICO	S														S	S	S		
<i>Pinus monticola</i>	PIMO	S	S																	
<i>Populus tremuloides</i>	POTRE			R		RS			S	S	S						S	S		
<i>Populus trichocarpa</i>	POTRI			R																
<i>Pseudotsuga menziesii</i>	PSME				PS	P	PS	PS	P	P	P			P						
SHRUBS																				
<i>Acer glabrum</i>	ACGL	R	R	R		R						R	R	R	R			R		
<i>Alnus sinuata</i>	ALSI	R	R			R											R			
<i>Amelanchier alnifolia</i>	AMAL	R		R							R	R		R	R	R			R	
<i>Ceanothus sanguineus</i>	CESA	S	S	S	S	S	S				S	S	AS	AS	AS	AS			AS	
<i>Ceanothus velutinus</i>	CEVE	S												AS	AS	AS				
<i>Holodiscus discolor</i>	HODI	R		R									R		R	AS				
<i>Lonicera utahensis</i>	LOUT				R					R			R		R	R	R			
<i>Oplopanax horridum</i>	OPHO									R										
<i>Pachistima myrsinites</i>	PAMY	RS		RS	RS	RS		S		S	AS	R	AS	AS	AS	AS	R	R	R	
<i>Prunus emarginata</i>	PHEM												R		R	R			R	
<i>Ribes lacustre</i>	RILA																S			
<i>Ribes viscosissimum</i>	RIVI																S			
<i>Rosa gymnocarpa</i>	ROGY			R	R	R						R	R	R	R	R		R	R	
<i>Rubus leucodermis</i>	RULE					S		AS	AS	AS	AS									
<i>Rubus parviflorus</i>	RUPA		R	R	R	H		AS	R	R	R			R		AS	R	R	R	
<i>Salix scouleriana</i>	SASC	RS	RS	RS	S	RS	S	S	S	S	AS	AS	AS	AS	R	AS	AS	AS	AS	
<i>Sambucus racemosa</i>	SARA							AS	HS	S	S									
<i>Sorbus scopulina</i>	SOSC	R				R							R							
<i>Spiraea betulifolia</i>	SPBE	R*											R	R	R	R*		R*		
<i>Symphoricarpos albus</i>	SYAL												R	R	R	R				
<i>Vaccinium membranaceum</i>	VAME	R		R	R	R	R	R	R	R	R				R	R			R	
HERBS (includes low woody plants)																				
<i>Achillea millefolium</i>	ACMI														R	R				
<i>Adenocaulon bicolor</i>	ADBI					R			R*	R*										
<i>Agrostis alba</i>	AGAL	S*												S*		S*				
<i>Agrostis scabra</i>	AGSC	S*														S*				
<i>Anaphalis margaritacea</i>	ANMA		X		X				X*	X	X*	X	X	X	X	X		X*	X*	
<i>Apocynum androsaemifolium</i>	APAN	R*	R*	R*	R	R				R			R	R					R	
<i>Arabis holboellii</i>	ARHO															S				
<i>Aralia nudicaulis</i>	ARNU		R																	
<i>Arnica cordifolia</i>	ARCO												R		R					
<i>Arnica latifolia</i>	ARLA									R									R	
<i>Asarum caudatum</i>	ASCA									S										
<i>Aster conspicuus</i>	ASCO														R*					
<i>Aster engelmannii</i>	ASEN														R*	R*				
<i>Athyrium filix-femina</i>	ATFI							N		N										
<i>Barbarts repens</i>	BERE												R	R	R	R			R	
<i>Calamagrostis rubescens</i>	CARU	R*		R*									R*		R*	R*			R*	
<i>Calochortus apiculatus</i>	CAAP														R*					
<i>Carex deweyana</i> ¹	CADE																			
<i>Carex geyeri</i>	CAGE														R					
<i>Carex rossii</i>	CARO	S		S	S	S		S		S	S	S	S	S	S	S			S	
<i>Castilleja miniata</i> ¹	CAMI																			
<i>Chenopodium album</i>	CHAL					S*														
<i>Cirsium arvense</i>	CIAR								R*	R*										
<i>Cirsium vulgare</i>	CIVU							S					S	S		S				
<i>Clintonia uniflora</i>	CLUN	R		R	R	R	R	R	R	R		R			R	S*	S*		R	
<i>Collinsia parviflora</i>	COPA												S*		S*	S*				

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